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COMPOSITAE OF THE GUAYANA HIGHLAND-XIV. FOUR NEW SPECIES OF *CALEA* (NEUROLAENEAE) FROM TEPUI SUMMITS IN VENEZUELA

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ABSTRACT

Four new species of *Calea* (Neurolaeneae) from the Venezuelan Guayana are described: **Calea coridifolia** Pruski, **Calea granitica** Pruski, **Calea ottohuberi** Pruski, and **Calea venosa** Pruski.

KEY WORDS: Asteraceae, *Calea*, Compositae, Guayana, Heliantheae, Neurolaeneae, tepui, Venezuela.

Four new species of *Calea* (Compositae: Neurolaeneae, formerly Heliantheae) from the Venezuelan Guayana are described preliminary to my revision of South American *Calea* L. Materials of the four species were kindly sent to me for determination by Otto Huber. These new species are validated herein so that their names may be used in ecological studies by Dr. Huber, who has begun to distribute duplicates of each of these four novelties.

These new species were listed by Pruski (1997) as *Calea* spp. B-E. At present, "*Calea* sp. A" in Pruski (1997) is known only from imperfect material and appears to represent depauperate plants of *Calea lucidivenia* Gleason & S.F. Blake. Three of the species described below are known only from their respective type collections and are endemic to Amazonas, Venezuela, whereas the fourth is endemic to Sierra de Maigualida, along the border of Edos. Amazonas and Bolívar, Venezuela. Pruski (1997) listed *Calea* and *Mikania* Willd. (Eupatorieae) as the most speciose genera of Venezuelan Guayanan Compositae, each having 27 species reported from the region. Nineteen of the known Venezuelan Guayanan Caleas are endemics, including the four species below, each of which appears to be a narrow endemic.

CALEA CORIDIFOLIA Pruski, sp. nov. Figs. 1, 2. **TYPE: VENEZUELA. Amazonas. Dpto. Atures:** cumbre del Cerro Coro-Coro, en las cabeceras nor-occidentales del Río Manapiare (sector NW de la Serranía Yutajé), 5°46'N, 66°12'W, 2200 m, 12 Nov 1987, *Otto Huber 12320* (holotype: MO!; isotype: VEN!).

Suffruticosa 20–35 cm alta dense foliata; folia sessilia, lamina 1–2.3 cm longa 0.5–1 mm lata univenosa glabra, margo integer; capitulescentia monocephala; pedunculi 1–3 cm longi; capitula radiata 7–9 mm alta 8–10 mm lata; involucrum campanulatum; phyllaria 3-seriata; flosculi radii 6–7, corollis ca. 10.5 mm longis; flosculi disci ca. 15, corollis 3.5–3.8 mm longis; cypselae ca. 3 mm longae; squamae pappo ca. 12, 2.5–3.5 mm longae.

Small subshrubs from woody caudex, 20–35 cm tall; stems erect, few-branched, subvirgate, leaves densely inserted in distal 2–10 cm, few-ridged, glabrous, internodes ca. 2 mm long, subequal throughout; herbage glabrous or nearly so. **Leaves** opposite, ascending, sessile; blade linear, 1–2.3 cm long, 0.5–1 mm wide, stiffly chartaceous, green but drying reddish, 1-veined, surfaces eglandular, glabrous, midrib broad abaxially, margins entire, apical mucro stiff, sometimes brownish. **Capitulescence** terminal, monocephalous, capitula subnutant in bud, exserted from the subtending

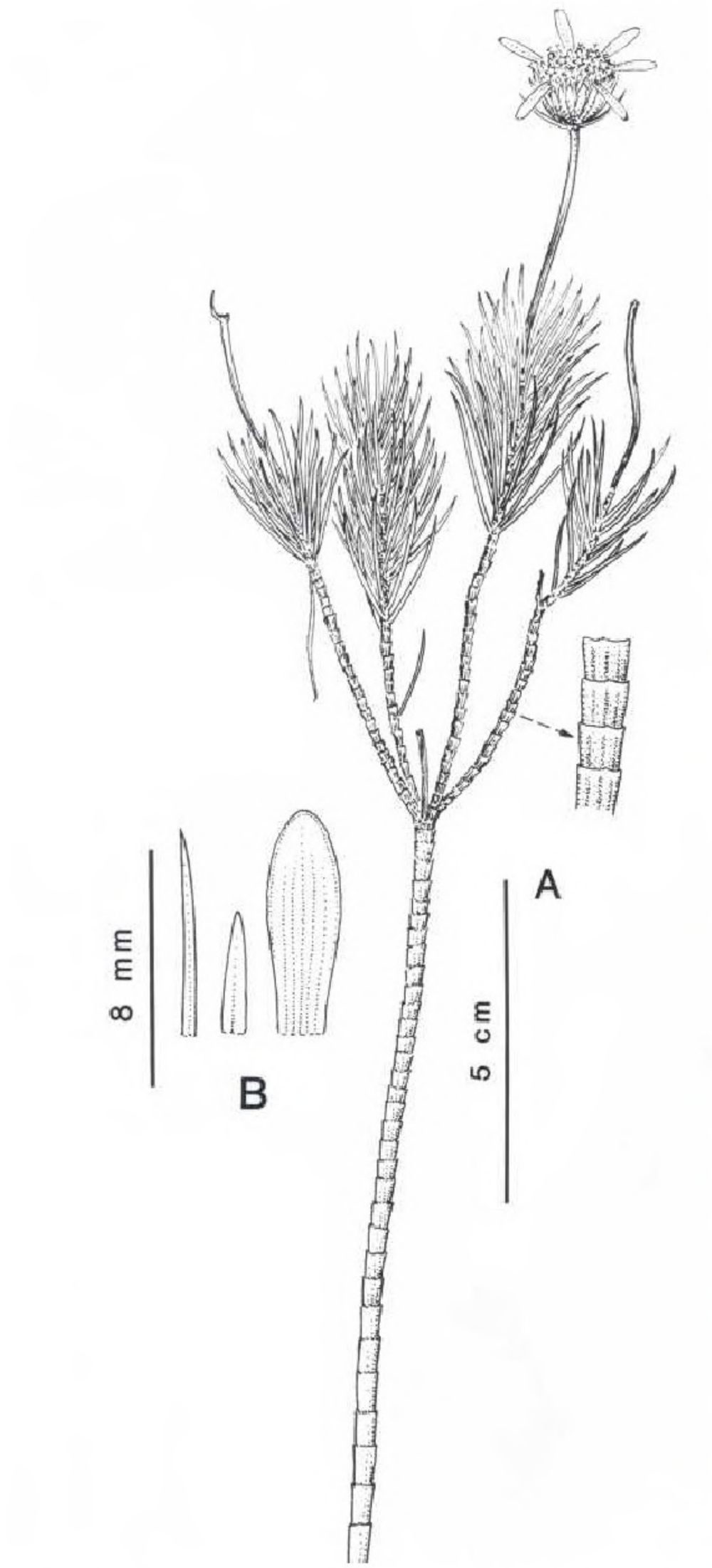

Figure 1. *Calea coridifolia* Pruski. A, habit, with close-up of stem; B, phyllaries; C, ray floret, D, disk floret; E, palea. Drawn from the type collection, *Huber 12320*, by Bruno Manara.

Figure 2. *Calea coridifolia* Pruski. Habit of type collection, *Huber 12320*. Photograph by Otto Huber.

leaves; peduncles 1–3 cm long, pale reddish pre-anthesis. **Capitula** radiate, 7–9 mm tall, 8–10 mm wide, 21–22-flowered; involucre campanulate; phyllaries appressed, 3-seriate, glabrous; outer 5 phyllaries foliar, linear-lanceolate, ca. 6 mm long, ca. 1 mm wide, about as long as the inner phyllaries, evenly and gradually narrowed distally, apex long-attenuate; inner phyllaries oblong, ca. 7

mm long, ca. 2 mm wide, chartaceous, 5–7-striate, drying reddish, apex obtuse; paleae ca. 5.8 mm long, apex acute. **Ray florets** 6–7: corolla ca. 10.5 mm long, yellow, tube ca. 3 mm long, limb obovate, ca. 7.5 mm long, 5-nerved, apex broadly obtuse to nearly truncate, with 3 shallow rounded lobes, abaxially glabrous. **Disk florets** ca. 15; corolla funnelform, 3.5–3.8 mm long, yellow, glabrous, tube ca. 1.2 mm long, throat 1.5–1.8 mm long, lobes ca. 0.8 mm long, style branches ca. 0.7 mm long. **Cypselae** ca. 3 mm long, sparsely setulose distally; pappus scales ca. 12, 2.5–3.5 mm long, subequal, about as long as the cypselae, those of the disks slightly longer.

Distribution and ecology: *Calea coridifolia* occurs in rocky tepui meadows on Cerro Coro-Coro of the Serranía Yutajé at about 2200 meters elevation. It is known to flower in November.

Calea coridifolia, known only from the type collection, is named for its leaves that resemble those of the Mediterranean-centered genus *Coris* L. (Primulaceae). The epithet also alludes to Cerro Coro-Coro, where this strange species is presumably a narrow endemic. Like the geographically near *C. nana* Maguire (Cerro Cuao and Cerro Sipapo, Venezuela), *C. coridifolia* is a small subshrub with radiate capitula, but *C. nana* differs most obviously by its loosely inserted elliptic leaves. *Calea coridifolia* was called *"Calea* sp. C" in Pruski (1997).

CALEA GRANITICA Pruski, sp. nov. Fig. 3. **TYPE: VENEZUELA. Bolívar. Distrito Cedeño:** Sierra de Maigualida, sector nor-oriental, altiplanicie tepuyana disectada sobre granito en las cabeceras del Río Chajura, afluente occidental del Río Erebato, aprox. 100 Km (en línea recta) al SW del Campamento Entreríos, 5°33'N, 65°13'W, 2100 m, 18 Nov 1988, *Otto Huber & Liz Izquierdo 12821* (holotype: NY!; isotypes: MO!, VEN!).

Suffruticosa vel fruticosa 0.3–2 m alta; folia brevipetiolata, lamina elliptica vel oblonga 1.5–5 cm longa 0.7–3 cm lata subcoriacea triplinervis saepe subtus glandulosa hirsutula, margo paucicrenati-dentatus; capitulescentia monocephala; pedunculi (1–)3–5 cm longi; capitula radiata 10–18 mm alta 15–20 mm lata; involucrum hemisphaericum; phyllaria 3-4-seriata; flosculi radii 11–15, corollis 16.4–21.2 mm longis; flosculi disci ca. 71, corollis 5.5–6 mm longis; cypselae 2.6–3 mm longae; squamae pappo ca. 20, 3.5–4.6 mm longae.

Subshrubs to shrubs, 0.3–2 m tall; stems ascending, moderately-branched, leafy, subhexagonal, pluristriate, hirsutulous or hirsute to glabrate, internodes usually about ½ as long as to nearly as long as leaves. **Leaves** opposite, spreading, short-petiolate; petiole stout, 2–7 mm long, hirsutulous or glabrous; blade elliptic to oblong, 1.5–5 cm long, 0.7–3 cm wide, subcoriaceous, consistently 3-veined from near base, the basal-most pair of strongly arching secondary veins only slightly thicker than the more distal secondaries, distal secondary veins and tertiary veins clearly pinnate-reticulate, raised adaxially, weakly translucent, adaxial surface glabrous, abaxial surface often glandular, also with sparse appressed moniliform trichomes and often sparsely hirsutulous with patent simple trichomes especially on the midrib and near margins, base cuneate to obtuse, margins crenate-dentate distally with 1–3 pairs of apically-directed teeth, apex acute to subobtuse. **Capitulescence** terminal, monocephalous on the several–many lateral branches, typically exserted from the subtending leaves; peduncles (1–)3–5 cm long. **Capitula** radiate, 10–18 mm tall, 15–20 mm wide, 82–86-flowered; involucre hemispherical, double; phyllaries subequal or obgraduate, 3–4-seriate; outer 4 phyllaries ovate, 11–16 mm long, 5–9.5 mm wide, commonly about as long as the inner phyllaries, ascending or slightly spreading, foliar, herbaceous throughout, subcoriaceous, apex acute; inner phyllaries oblong, 7.5–12 mm long, 3–4 mm wide, appressed, chartaceous becoming scarious distally, pluristriatulate, glabrous, apex obtuse to rounded; paleae 6–7 mm long, trifid, apex acuminate. **Ray florets** 11–15; corolla 16.4–21.2 mm long, yellow, tube 2.4–3.2 mm long, limb oblong, 14–18 mm long, 5–7-nerved, apex sometimes irregularly 3-lobed with central lobe to ca. 1 mm long, obtuse to nearly truncate, abaxially glandular. **Disk florets** ca. 71; corolla narrow-funnelform, 5.5–6 mm long, yellow, glabrous, tube 1.4–1.7 mm long, throat longer than lobes, lobes

Figure 3. *Calea granitica* Pruski. Photograph of an isotype (*Huber 12821*, MO) showing the double involucre and leaves 3-veined from near the base.

1.4–2 mm long; style branches ca. 1.5 mm long. **Cypselae** 2.6–3 mm long, sparsely hirtellous; pappus scales ca. 20, 3.5–4.6 mm long, subequal, longer than the cypselae, reaching to about the base of the disk corolla lobes.

Paratypes: **VENEZUELA. Amazonas. Dpto. Atures:** Sierra Maigualida, NW sector, small valley along an upper tributary of Caño Iguana, 5°30'N, 65°15'W, 2000 m, 28 Feb-3 Mar 1991, *P. Berry, O. Huber & J. Rosales 4894* (NY, U, US); Sierra de Maigualida, sector nor-occidental, cabeceras del Río Iguana, fluente del Rio Asita, bosque ribereño y matorrales secundarios sobre vertiente inclinada hacia el SE, 5°43'N, 65°19'W, 1720 m, 25 Mar 1988, *O. Huber 12710* (NY, VEN); Sierra de Maigualida, sector nor-oriental, altiplanicie disectada de granito en las cabeceras nor-orientales del Río Iguana, afluente del Río Ventuari, 5°40'N, 65°08'W, 2150 m, 24 Nov 1989, O. *Huber 13069* (NY, VEN); Cabeceras NW del Río Asita, en el sector NE de la Sierra de Maigualida, 5°31'50"N, 65°09'44"W, 1700 m, 9 Mar 1996, *O. Huber & R. Riina 13652* (MO). **Bolívar. Distrito Cedeño:** Sierra de Maigualida, sector nor-oriental, altiplanicie tepuyana ubicada en las cabeceras del Rio Chajura, afluente occidental del Rio Erebato, aprox. 100 Km (en línea recta) al SW del Campamento Entreríos, 5°33'N, 65°13'W, 2100 m, 28 Mar 1988, *O. Huber 12734* (NY, VEN).

Distribution and ecology: *Calea granitica* occurs occasionally in tepui meadows, high-tepui forests, and along streams at 1720–2150 meters elevation. *Calea granitica* is endemic to the largely granitic (whence the epithet) Sierra de Maigualida (which may loosely be called a tepui) on the border of Amazonas and Bolívar, Venezuela. It has been collected in flower in February, March, and November.

Calea granitica is a member of the Guayanan *Calea lucidivenia* Gleason & S.F. Blake species group, which is characterized by double involucres with broad foliar outer series of phyllaries and often by subglabrous herbage. *Calea granitica* differs from all members of this group by its short-petiolate subcoriaceous leaves that are consistently 3-veined from near the base. Although most Guayanan collections from past several decades were pressed in EtOH typically destroying diagnostic glandular indumentum and possibly disguising leaf texture, I believe that the leaf venation feature of *C. granitica* holds true.

By its often hirsutulous or hirsute herbage with patent simple trichomes and massive capitula, *Calea granitica* is most similar to *C. tricephala* Maguire (Cerro Parú, Venezuela), which differs by long-petiolate chartaceous leaves that are 3-veined from well above base. Pruski (1997) mentioned that *C. lucidivenia* var. *punctata* Maguire & Wurdack is a possible synonym of *C. tricephala*, but the geographically intermediate *C. granitica* differs in diagnostic characters, albeit these vegetative. *Calea granitica* was given as "*Calea* sp. B" in Pruski (1997).

CALEA OTTOHUBERI Pruski, sp. nov. Fig. 4. **TYPE: VENEZUELA. Amazonas. Dpto. Atures:** Serranía Uasadi, sector nor-occidental, cumbres montañosas ubicadas en las cabeceras orientales del Río Asita, afluente derecho del Río Ventuari, herbazales y bosquecillos tepuyanos sobre granito, 5°21'N, 65°12'W, 1850 m, 22 Nov 1988, *Otto Huber 12842* (holotype: MO!; isotype: VEN!).

Fruticosa 1–3 m alta; folia petiolata, lamina elliptica 1.5–3.7 cm longa, 0.5–1.2 cm lata chartacea subtriplinervis subtus glandulosa, margo serrulatus; capitulescentia cymosa capitulis saepe 3; pedunculi 1.5–2.5 cm longi; capitula discoidea 8–10 mm alta, 5–7.5 mm lata; involucrum anguste campanulatum; phyllaria ca. 4-seriata; flosculi disci 15–18, corollis 5–5.2 mm longis; cypselae 2.6–3 mm longae; squamae pappo ca. 18, 4–5 mm longae.

Shrubs, 1–3 m tall; stems ascending, moderately branched, leafy, subhexagonal, costae subglabrous, sulci villosulous-tomentellous, internodes usually about ½ as long as leaves. **Leaves** opposite, spreading, petiolate; petiole to 5 mm long; blade elliptic, 1.5–3.7 cm long, 0.5–1.2 cm wide, chartaceous, drying reddish, pinnately 3-nerved from ca. 5 mm above base, main lateral pair of secondary veins reaching to near distal 1/3 of blade, surfaces sparsely hirsutulous, abaxial surface

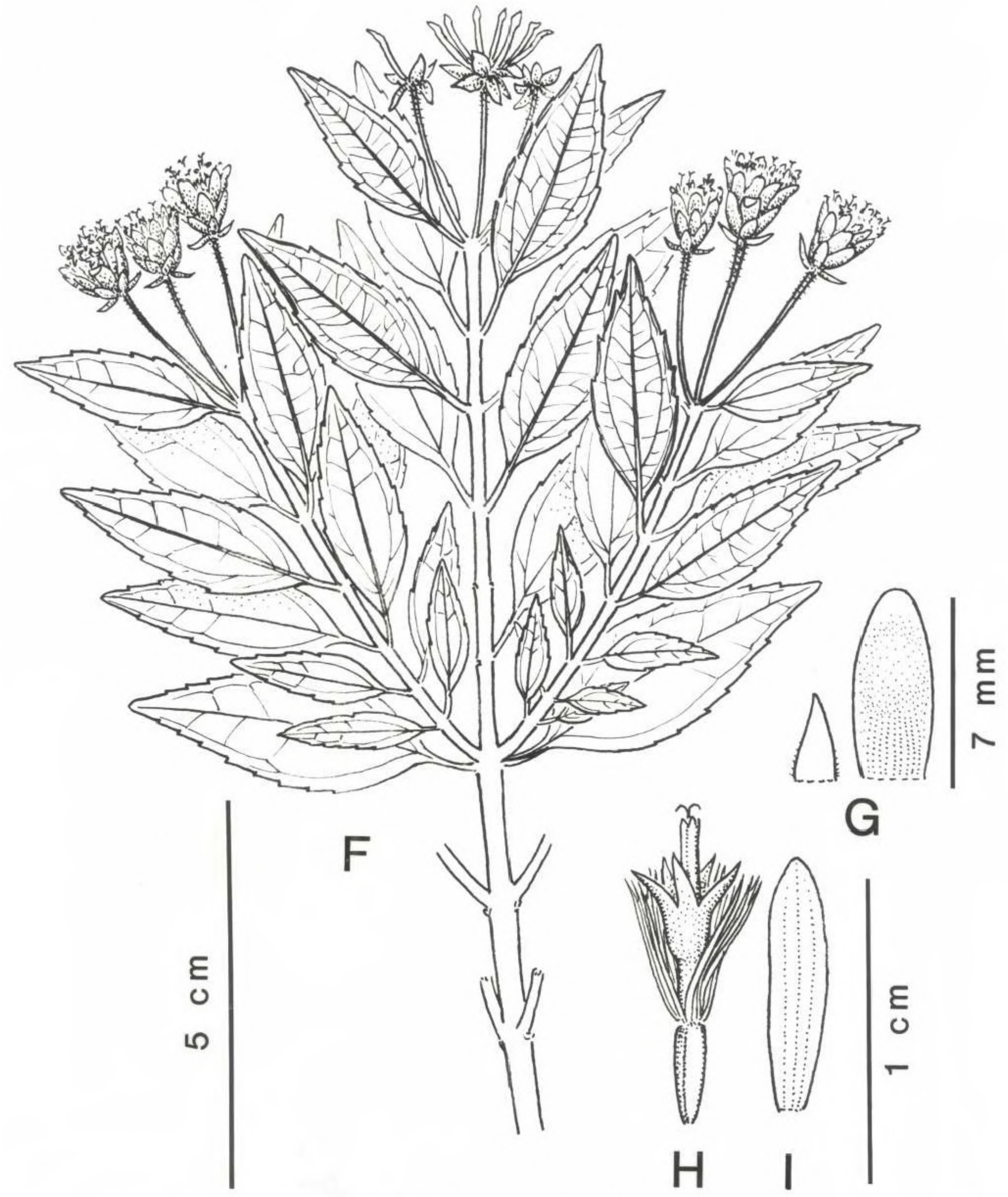

Figure 4. *Calea ottohuberi* Pruski. F, habit; G, phyllaries; H, disk floret; I, palea. Drawn from the type collection, *Huber 12842*, by Bruno Manara.

also glandular, base cuneate, margins serrulate, subrevolute, apex acute to acuminate. **Capitulescence** openly cymose, usually 3-capitulate, capitula obviously pedunculate and held slightly above subtending leaves; peduncles 1.5–2.5 cm long, hirsutulous. **Capitula** discoid, 8–10 mm tall, 5–7.5 mm wide, 15–18-flowered; involucre narrowly campanulate; phyllaries graduated, ca. 4-seriate; outer 2–3 phyllaries broadly lanceolate, ca. 4 mm long, ca. 1.5 mm wide, spreading laterally, subherbaceous, 3-veined, hirsutulous, apex acute; mid-series and inner phyllaries appressed, chartaceous, finely striatulate, glabrous or sometimes merely subglabrous, apex obtuse to rounded; mid-series phyllaries ovate, 3–5 mm long, ca. 3 mm wide, evenly grading to inner phyllaries, these oblong, 7–9 mm long, ca. 3 mm wide; paleae 5.5–6 mm long. **Ray florets** absent. **Disk florets** 15–18; corolla narrowly campanulate, 5–5.2 mm long, yellow, glabrous, tube 1.5–2 mm long, slightly broadened basally, throat and lobes subequal, lobes 1.3–2 mm long; style branches ca. 1 mm long. **Cypselae** 2.6–3 mm long, eglandular, glabrous; pappus scales ca. 18, 4–5 mm long, subequal, longer than cypselae, about as long as corollas.

Distribution and ecology: *Calea ottohuberi* occurs along the border of high-tepui forests with meadows on Serranía Uasadi at about 1850 meters elevation and is known to flower in November.

I am happy to dedicate this new species to my good friend Otto Huber, the world authority of the Flora of the Guayana Highland. Although the genus *Huberopappus* Pruski (Vernonieae) was named for Dr. Huber, this is the first new species I've had the occasion of naming for him.

By its leaf features and discoid capitula, *Calea ottohuberi* seems to be most closely related to *C. abelioides* S.F. Blake (Guayanan Brazil, Colombia, and Venezuela), which differs by pubescent cypselae and *C. neblinensis* (Maguire & Wurdack) Pruski (Sierra de la Neblina, Venezuela), which differs by its glabrous herbage and glabrous cypselae. *Calea ottohuberi,* known only from the type collection, was given as *"Calea* sp. D" in Pruski (1997).

CALEA VENOSA Pruski, sp. nov. Fig. 5. **TYPE: VENEZUELA. Amazonas. Dpto. Atures:** cumbre del Cerro Coro-Coro, en las cabeceras nor-occidentales del Río Manapiare (sector NW de la Serranía Yutajé), 5°46'N, 66°12'W, 2200 m, 12 Nov 1987, *Otto Huber 12294* (holotype: MO!; isotypes: NY!, VEN!).

Suffruticosa ca. 1 m alta; folia brevipetiolata, lamina orbiculata vel cuneata-obovata 1–1.7 cm longa 0.7–1.8 cm lata subcoriacea pinnatim venosa glandulosa, margo paucicrenati-dentatus; capitulescentia cymosa capitulis saepe 3–6; pedunculi 0.5–1 cm longi; capitula radiata 10–12 mm alta 6–9 mm lata; involucrum aunguste campanulatum; phyllaria ca. 4-seriata; flosculi radii 4–5, corollis 9–10 mm longis, limbo glandulifero; flosculi disci 14–18, corollis 5.2–5.7 mm longis; cypselae 3–3.4 mm longae; squamae pappo ca. 16, 4.2–5.5 mm longae.

Subshrubs to shrubs, to ca. 1 m tall; stems ascending, moderately branched, leafy distally, subhexagonal, hirsutulous and glandular, sulcate, internodes usually about ½ as long as leaves. **Leaves** opposite, spreading, short-petiolate; petiole stout, 1–2 mm long, subglabrous; blade orbicular to cuneate-obovate, 1–1.7 cm long, 0.7–1.8 cm wide, subcoriaceous, venation pinnate-reticulate, secondary and tertiary veins prominent, raised adaxially, somewhat translucent, each side with 3–6 larger arching secondary veins with thinner intermediate secondaries, both surfaces glandular, sometimes also sparsely hirtellous with submoniliform trichomes, base cuneate to obtuse, margins crenate-dentate distally with a few apically directed teeth, apex broadly obtuse to nearly truncate. **Capitulescence** cymose, usually 3–6-capitulate; peduncles 0.5–1 cm long, densely hirsutulous, the capitula not exserted from the subtending leaves. **Capitula** radiate, 10–12 mm tall, 6–9 mm wide, 18–23-flowered; involucre narrowly campanulate, somewhat double; phyllaries subequal or

Figure 5. *Calea venosa* Pruski. Photograph of the holotype (*Huber 12294*, MO) showing the prominently veined leaves.

obgraduate, ca. 4-seriate; outer 2–4 phyllaries broadly lanceolate, 8–10 mm long, 2–3 mm wide, about as long as the inner, ascending, herbaceous, subcoriaceous, glandular, apex acute, inserted ca. 1 mm below inner phyllaries; inner phyllaries ovate, 7–8 mm long, 3–4 mm wide, appressed, chartaceous in proximal 2/3, distal 1/3 subherbaceous and glandular, faintly ca. 5-striate, apex obtuse; paleae 6–6.5 mm long, apex obtuse. **Ray florets** 4–5; corolla 9–10 mm long, yellow, tube ca. 3 mm long, limb oblong, 6–7 mm long, 7-nerved, apex obtuse to rounded, glandular abaxially. **Disk florets** 14–18; corolla funnelform, yellow, tube stout, 2.5–2.7 mm long, glandular in distal ½, throat and lobes subequal, lobes 1.3–1.7 mm long; style branches ca. 1 mm long. **Cypselae** 3–3.4 mm long, sparsely setose and glandular distally; pappus scales ca. 16, 4.2–5.5 mm long, subequal, longer than the cypselae, reaching to about the middle of disk corolla lobes.

Distribution and ecology: *Calea venosa* occurs at about 2200 meters elevation among rocks on the summit Cerro Coro-Coro of the Serranía Yutajé and is known to flower in November.

Calea venosa is named for its prominently veined leaves, and is known only from the type collection. By its broad subglabrous leaves, *C. venosa* brings to mind *C. orbiculata* Maguire & Aristeg. (Cerro Coro-Coro and Cerro Yutajé, Venezuela) and *C. punctata* Maguire & Wurdack (Cerro Yutajé, Venezuela), but these tepui summit species differ from *C. venosa* by their fewer and unequal pappus scales and their massive capitula. *Calea venosa* is actually more similar in technical features to species of the *Calea lucidivenia* Gleason & S.F. Blake group, with *C. venosa* being unique by the combination of small, orbicular to cuneate-obovate leaves and smaller capitula with an involucre only somewhat double and narrower outer phyllaries. *Calea venosa* was given as *"Calea* sp. E" in Pruski (1997).

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